Final

Record of Decision for Parcel G

Hunters Point Shipyard
San Francisco, California

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Prepared by:
Department of the Navy
Base Realignment and Closure
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Table 4. Remediation Goals for Soil and Groundwater

Exposure Scenario	Chemical of Concern	Remediation Goal / Basis
Soil		
Residential	Manganese	1,431 / HPAL
Recreational	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.33 / RBC
Industrial	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.33 / PQL
	Benzo(b)fluoranthene	1.76 / RBC
	Lead	800 / RBC
Construction Worker	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.65 / RBC
	Lead	800 / RBC
	Manganese	6,889 / RBC
Groundwater		
Residential – Vapor Intrusion	Chloroform	1.0 / PQL
	Methylene Chloride	27 / RBC
	Trichloroethene	2.9 / RBC
Industrial – Vapor Intrusion	Benzene	0.63 / RBC
	Carbon Tetrachloride	0.50 / PQL
	Chloroform	1.2 / RBC
	Naphthalene	6.0 / RBC
	Tetrachloroethene	1.0 / PQL
	Trichloroethene	4.8 / RBC
	Xylene (total)	337 / RBC
Construction Worker – Trench Exposure	Arsenic	40 / RBC
	Benzene	17 / RBC
	Naphthalene	17 / RBC
	Tetrachloroethene	18 / RBC
	Xylene (total)	861 / RBC
Migration to Surface Water of Bay	Chromium VI	50 / SWC
	Nickel	96.5 / HGAL

Notes:

Soil remediation goals are in milligrams per kilogram (mg/kg).

Groundwater remediation goals are in micrograms per liter (µg/L).

Groundwater remediation goals for chromium VI and nickel are at the point of discharge to the Bay.

Exposures in the residential, industrial, and construction worker scenarios consider exposure to soil from 0 to 10 feet below ground surface. The recreational exposure scenario considers exposure to soil from 0 to 2 feet below ground surface.

Remediation goals for volatile organic compounds to address exposure via indoor inhalation of vapors may be superseded based on chemicals of concern identification information from soil gas surveys that may be conducted in the future. These future action levels would be established for soil gas, would account for vapors from both soil and groundwater, and would be calculated based on a cumulative risk level of 10^{-6} using the accepted methodology for risk assessments at the Hunters Point Shipyard.

HGAL Hunters Point groundwater ambient level
HPAL Hunters Point ambient level
PQL Practical quantitation limit
RBC Risk-based concentration
SWC Surface water criteria

Table 5. Remediation Goals for Radionuclides

Radionuclide	Surfaces (dpm/100 cm^2)		Soil (pCi/g)		Water (pCi/L)
	Equipment Waste [a]	Structures[b]	Construction Worker	Resident[d]	
Cesium-137	5,000	5,000	0.113	0.113	119
Cobalt-60	5,000	5,000	0.0602	0.0361	100
Plutonium-239	100	100	14	2.59	15
Radium-226	100	100	1[c]	1[c]	5
Strontium-90	1,000	1,000	10.8	0.331	8
Thorium-232	1,000	36.5	19	1.69	15
Hydrogen-3	5,000	5,000	4.23	2.28	20,000
Uranium-235 + daughters	5,000	488	0.398	0.195	30

Notes:

a Limits for removable surface activity are 20 percent of these values.

b Remediation goals are consistent with those issued in the Radiological TCRA Action Memo. Remediation goals meet the 25 millirem per year residual dose level consistent with 10 CFR Section 20.1402. Furthermore, for most radionuclides of concern, goals meet the 15 millirem per year residual dose level consistent with the 1997 EPA OSWER Directive (OSWER No. 9200.4-18). Of exception is the goal for Thorium-232 goal which due to detection limit technical limitations, corresponds to a dose of 25 mrem/yr.

c Goal is 1 pCi/g above background per agreement with EPA.

d All radiologically impacted soils in this parcel will be remediated according to Residential Remediation Goals.

ARAR	Applicable or relevant and appropriate requirements
CFR	Code of Federal Regulations
dpm/100cm^2	Disintegration per minute per one hundred square centimeters
EPA	U.S. Environmental Protection Agency
millirem	One thousandth of a rem (10^{-3})
mrem/yr	Millirem per year
NRC	Nuclear Regulatory Commission
OSWER	Office of Solid Waste and Emergency Response
pCi/g	Picocurie per gram
pCi/L	Picocurie per liter
TCRA	Time-Critical Removal Action

2.8.1 Description of Remedial Alternatives

Table 6 provides the major components, details, and cost of each remedial alternative identified for soil, groundwater, and radiologically impacted sites.

2.8.2 Comparative Analysis of Alternatives

A comparative analysis of alternatives with respect to the **nine evaluation criteria**(33) was completed and is provided below. Table 7 depicts a relative ranking of the alternatives.